

**WE CLAIM**

1 1. A method of managing storage resources associated with a network having at least  
2 one storage resource coupled to at least one server and at least one client over at least one  
3 data path, wherein said server manages said storage resources over said data path, and  
4 wherein said client directs I/O requests to said storage resources and redirects I/O requests to  
5 said server upon the detection of a failure condition.

1 2. The method of claim 1 which further includes:  
2 authentication of said client; and  
3 communication of volume information associated with said storage resource to said  
4 client based on the results of said authentication.

1 3. The method of claim 1 which further includes:  
2 allocation of storage space from said storage resource in response to a client request;  
3 and  
4 communication of volume information associated with said allocated space to said  
5 client.

1 4. The method of claim 1 which further includes:  
2 allocation of a new storage space from said storage resource in response to a receipt  
3 of a failure condition from a client;  
4 initiation of the recovery of the contents associated with said failure condition in  
5 cooperation with said new storage space; and  
6 communication of a recovery status to said client, wherein said client and said server  
7 continue said recovery based on said recovery status.

1 5. The method of claim 4 wherein said new storage space includes a new disk  
2 associated with a new physical storage resource.

1 6. The method of claim 1 which further includes:  
2 changing the volume configuration corresponding to said storage resource;  
3 committing the changes to said changed configuration, during which time said client  
4 is excluded from accessing said storage resource; and

5 communicating the new state of said configuration to said client.

1 7. The method of claim 1 which further includes:

2 providing a copy of unmodified data blocks before modifying said data blocks; and

3 communicating a list of said modified data blocks to a backup process residing on

4 said server, wherein said backup process uses a pseudo-device to read said unmodified

5 blocks and the original contents of the modified data blocks.

1 8. The method of claim 1 which further includes:

2 communication between said clients and said servers over at least a second data path.

1 9. A distributed shared storage resource management system comprising:

2 at least one storage resource coupled to at least one server and at least one client over at least

3 one data path, wherein said server manages said storage resource over said data path, and

4 said client directs I/O requests to said storage resource and redirects said I/O requests to said

5 server upon the detection of a failure condition.

1 10. The system of claim 9 wherein said server is configured to:

2 authenticate each client; and

3 communicate volume information associated with said storage resource to said client

4 based on the results of said authentication.

1 11. The system of claim 9 wherein said server is configured to:

2 allocate space from said storage resource in response to a request from a client; and

3 communicate volume information associated with said allocated space to said client.

1 12. The system of claim 9 wherein said server is configured to:

2 allocate a new storage space from said storage resource in response to a receipt of a

3 failure condition from a client;

4 initiate the recovery of the contents associated with said failure condition in

5 cooperation with said new storage space; and

6 communicate to said client the recovery status, wherein said client and said server

7 continue said recovery based on said recovery status.

13. The system of claim 12 wherein said new storage space includes a new disk associated with new physical storage resource.

14. The system of claim 9 wherein said server is configured to:  
change volume configuration associated with said storage resource;  
commit the changes to said changed configuration during which time said client is excluded from accessing said storage resource; and  
communicate the new state of said configuration to said client.

15. The system of claim 9 wherein said client is configured to:  
provide a copy of unmodified data blocks before modifying said unmodified data blocks; and  
communicate a list of said modified data blocks to a backup process residing on said server, wherein said backup process uses a pseudo-device to read said unmodified and modified data blocks.

16. The system of claim 9 further includes:  
at least a second data path configured to allow communication between said client and said server.

17. An article comprising a computer-readable medium that stores computer executable instructions for causing a computer in a distributed shared storage resource management system which comprises at least one storage resource coupled to at least one server and at least one client over at least one data path, wherein said computer executable instructions cause said server to manage said storage resource over said data path, and said client to direct I/O requests to said storage resource and redirect said I/O requests to said server upon the detection of a failure condition.

18. The article of claim 17 further includes instructions to:  
authenticate each client; and  
communicate volume information associated with said storage resource to said client based on the results of said authentication.

19. The article of claim 17 further comprising instructions to:

2 allocate space from said storage resource in response to a request from a client; and  
3 communicate volume information associated with said allocated space to said client.

1 20. The article of claim 17 further comprising instructions to:  
2 allocate a new storage space from said storage resource in response to a receipt of a  
3 failure condition from a client;  
4 initiate a recovery of the contents associated with said failure condition in cooperation  
5 with said new storage space; and  
6 communicate a recovery status to said client, wherein said client and said server  
7 continue said recovery based on said recovery status.

1 21. The article of claim 20 wherein said new storage space includes a new disk associated  
2 with a new physical storage resource.

1 22. The article of claim 17 further comprising instructions to:  
2 change configuration associated with said storage resource;  
3 commit said changes to said changed configuration during which time said client is  
4 excluded from accessing said storage resource; and  
5 communicate the new state of the changed configuration to said client.

1 23. The article of claim 17 further comprising instructions to:  
2 provide a copy of unmodified data blocks before modifying said unmodified data  
3 blocks; and  
4 communicate a list of said modified data blocks to a backup process residing on the  
5 server, wherein said backup process uses a pseudo-device to read said unmodified blocks and  
6 the original contents of the modified data blocks.

1 24. The article of claim 17 further comprising instructions to:  
2 provide at least a second data path to facilitate communication between said client  
3 and said server.

1 25. A method of managing storage resources associated with a network having at least  
2 one storage resource coupled to at least one server and at least one client over at least one  
3 data path, wherein said server manages said storage resources over said data path, and

4 wherein said client directs I/O requests to said storage resources and redirects I/O requests to  
5 said server upon the detection of a failure condition, wherein said method comprising:  
6 changing the volume configuration corresponding to said storage resource;  
7 committing the changes to said changed configuration, during which time said client is  
8 excluded from accessing said storage resource; and  
9 communicating the new state of said configuration to said client.